



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/897,839	07/21/1997	YUHKO NISHIMOTO		4968
30132	7590	07/12/2002		
GEORGE A. LOUD 3137 MOUNT VERNON AVENUE ALEXANDRIA, VA 22305			EXAMINER MALDONADO, JULIO J	
			ART UNIT 2823	PAPER NUMBER

DATE MAILED: 07/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. <u>08/897,839</u>	Applicant(s) <u>NISHIMOTO ET AL.</u>
	Examiner <u>Julio J. Maldonado</u>	Art Unit <u>2823</u>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 43-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 43-45 and 47 is/are rejected.
- 7) Claim(s) 46 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) Interview Summary (PTO-413) Paper No(s) _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: page 4, line 19, "...SOC..." should be "...SOG...".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 43-45 are rejected under 35 U.S.C. 102(b) as being unpatentable by Itoh et al. (U.S. 5,160,998).

In reference to claim 43, Itoh et al. (Figs.6 and 8a-h') in a related art to the formation of metal wirings teach forming a first insulating layer (43) with a first type of stress; forming an aluminum interconnection layer (34) on and in contact with said first insulating layer (43); and forming a second insulating layer (44) with said first type of stress on and in contact with said interconnection layer (34), wherein said interconnection layer (34) is sandwiched between and in contact with said first insulating layer (43) and said second insulating layer (44) and wherein the total stress in said insulating layers is limited to less than 2×10^5 dyne/cm so as to suppress bending of said interconnection layer (34) (column 3, line 56 – column 8, line 18).

In reference to claims 44 and 45, Itoh et al. teach forming a third insulating layer (42) with a second type of stress that is different from said first type of stress, so as to adjust overall stress of said stress-adjusted insulating film before forming said first insulating layer (43) or after forming said second insulating layer (44), where said first type of stress is compressive stress and said second type of stress is tensile stress (column 3, line 56 – column 8, line 18).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al. ('998) in view of Matsuura et al. (U.S. 5,250,468).

Itoh et al. teach forming the first insulating layer (43) by plasma CVD process, and the second insulating film (44) by reactive gaseous mixtures (column 4, lines 13-41), but fail to teach the reactive gaseous mixtures include at least organic silane and aluminum. However, Matsuura et al. in a related method to form insulating films teach forming dielectric layers using plasma CVD processes and organic silane and oxygen and reactive mixture. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to form the dielectric layers of Itoh et al. with a gaseous mixture including at least organic silane and oxygen as taught by

Matsuura et al., since this materials are commonly used to form dielectric layers (column 1, lines 10-32).

Allowable Subject Matter

6. Claim 46 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record, Itoh et al. to U.S. 5,160,998 teach forming a first insulating layer (43) with a first type of stress; forming an aluminum interconnection layer (34) on and in contact with said first insulating layer (43); and forming a second insulating layer (44) with said first type of stress on and in contact with said interconnection layer (34), wherein said interconnection layer (34) is sandwiched between and in contact with said first insulating layer (43) and said second insulating layer (44) and wherein the total stress in said insulating layers is limited to less than 2×10^5 dyne/cm so as to suppress bending of said interconnection layer (34) (column 3, line 56 – column 8, line 18).

However, the prior art neither teach nor suggest expressing the overall stress as dependent of the thickness of the dielectric layers according to the equation:

$$\sigma_T = \sum_{i=1}^n (t_i X \sigma_i)$$

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Papers related to this application may be submitted directly to Art Unit 2823 by facsimile transmission. Papers should be faxed to Art Unit 2823 via the Art Unit 2823 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2823 Fax Center number is **(703) 305-3432**. The Art Unit 2823 Fax Center is to be used only for papers related to Art Unit 2823 applications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Julio J. Maldonado** at **(703) 306-0098** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via julio.maldonado@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (703) 308-4918.

Application/Control Number: 08/897,839
Art Unit: 2823

Page 6

Any inquiry of a general nature or relating to the status of this application should
be directed to the **Group 2800 Receptionist** at **(703) 308-0956**.

Julio J. Maldonado
Patent Examiner
Art Unit 2823
703-306-0098
julio.maldonado@uspto.gov

Wael J. Maldonado

SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER